

NOTES ON SCALE-INSECTS (COCCIDAE). PART II.

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This paper deals with a number of Coccids which have been forwarded through the Imperial Bureau of Entomology from the following countries : The Dutch West Indies, Barbados, British Guiana, Zanzibar, Uganda, Nyasaland, and Nigeria. Five species are herein described as new to science, the others, for the most part, are well-known pests affecting cultivated plants in various parts of the world.

***Icerya maxima*, sp. n.**

Female adult (fig. 1).—Dorsum covered with striated lamellae of white wax ; those in front relatively small and irregularly conchoidal in shape ; median row much the smallest ; submedian row very broad, curved outwards, and very thin ; marginal series of great length, ribbon-like and curled. Ovisac formed beneath the abdomen by a complete pellicle of closely-felted secretion which is attached to the sides of body only, thus a narrow space is formed between the pellicle

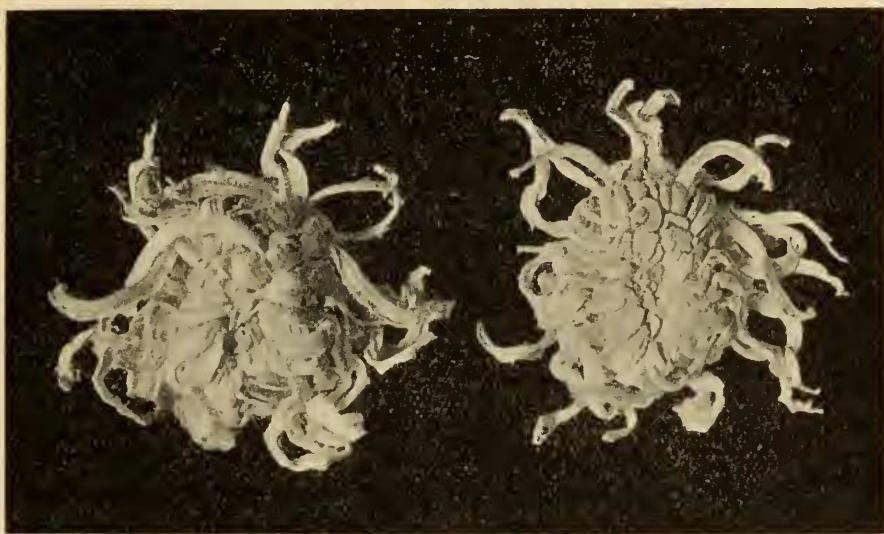


Fig. 1.—*Icerya maxima*, Newst., ♀ ♀, nat. size.

and the abdomen for the reception of the ova. Antennae (fig. 2a) of 11 segments of which the 2nd and the 11th are the longest ; all the segments with fine hairs, a few of those on the 8th to the 11th, inclusive, much longer than the rest. Spinnerets (fig. 2b) very abundant on the dorsal integument, but less so on the venter. Legs normal and very stout. Stigmata nearly as large as the coxae and very strongly chitinised. Rostrum provided with a long membranous tube, down which the loop of the filaments pass (?) when in repose or when partly or wholly retracted. Marginal hairs relatively short and slender.

Length, exclusive of marginal appendages, 18–21 mm. ; width 13–17 mm. The longest marginal appendage may measure as much as 15 mm.

Larva : Antennae (fig. 2c) of 6 segments, the 4th to 6th with exceedingly long hairs, the longest being about twice the length of the antenna ; so far as one can ascertain, there are at least 6 of these long hairs on the terminal segment, and 3 on the 4th and 5th respectively. Marginal hairs on the abdomen of similar length to those on the antennae, but stouter, and there are about twenty on either side ; the exact number must, however, remain in doubt, as the specimens have not restored at all well in the process of mounting for examination.

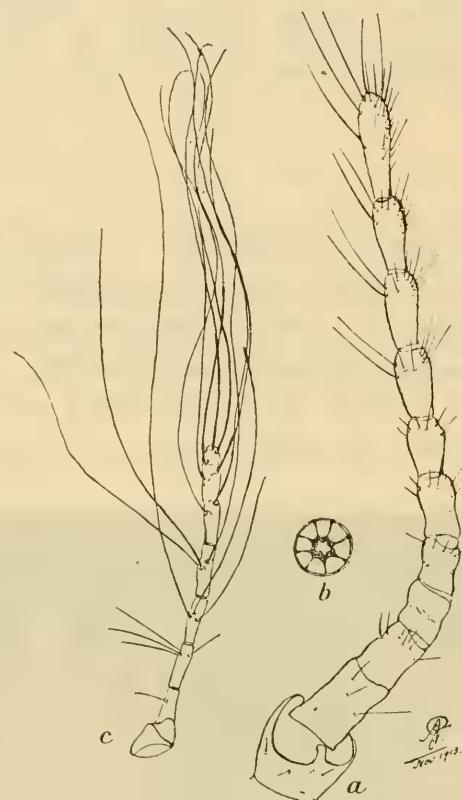


Fig. 2.—*Icerya maxima*, Newst. ; a, antenna of ♀ ; b, spinneret of ♀ ; c, antenna of larva.

GOLD COAST : Kwanyako, Winneba district, 16. xi. 13, on *Ficus* sp. (W. H. Patterson).

This is much the largest species of *Icerya* known to me, and apart from its great size is distinguishable by the enormous length of the thin ribbon-like waxen appendages to the margin of the body.

The larva, though it resembles that of *Icerya longisetosa*, Newst., is distinguished by the larger number of long hairs on both the abdomen and antennae.

Icerya seychellarum (Westwood).

UGANDA : Entebbe, 24. vi. 12, on *Monodora myristica* (C. C. Gowdey). NYASALAND : Mlanje, 22. iii. 13 (S. A. Neave).

This rather pretty little insect seems to be widely distributed, having been recorded from the Seychelles Islands, Madagascar, Mauritius, Madeira, China Formosa and New Zealand. Signoret's examples were found on sugar-cane, but it is apparently a somewhat general feeder, attacking such other plants as guava, palms, rose, citrus, *Artocarpus integrifolia*, etc.

Icerya sp.

UGANDA : Entebbe, 20. viii. 12, on orange (*C. C. Goudey*, no. 4336).

All the leaves submitted were heavily infested with young females. It is just possible that this insect may prove to be Douglas' *Icerya* (*Ortonia*) *natalensis*, but it will be necessary to secure old adults in order that a correct specific determination may be given. Douglas unfortunately did not describe the immature females and I know of no recent account of the younger stages of this insect in the literature of the COCCIDAE.

Aspidoproctus giganteus, sp. n.

Female adult, when perfect, completely covered with a thin, compact coating of dusky grey secretion ; the secretory matter is, however, frequently worn away, either partly or entirely so, revealing the dark castaneous chitin beneath. Dorsum with a large, double, mammiform projection, which arises at the junction of the abdomen with the thorax ; abdominal area with a submarginal series of tubercular projections, often but faintly indicated ; margin with short, broad and often bifid waxen appendages. Antennae (fig. 3a), very short, stout, being

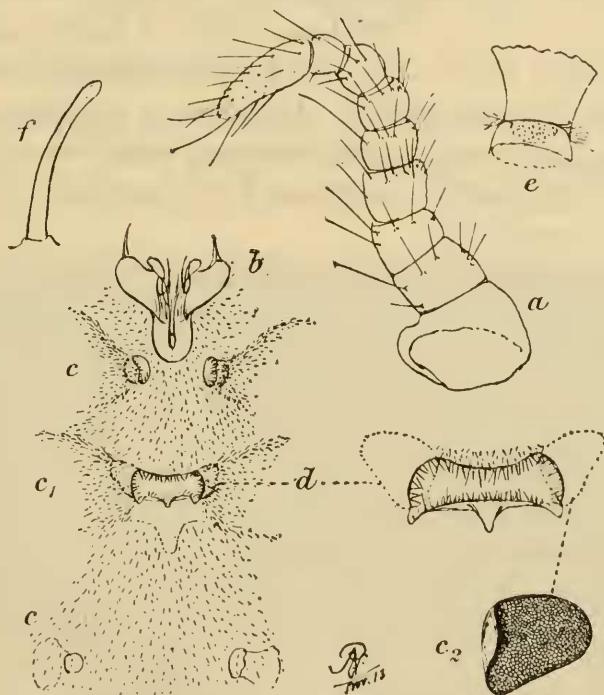


Fig. 3.—*Aspidoproctus giganteus*, Newst., ♀ ; a, antenna ; b, mentum ; c-c₂, large sternal glands ; d, mesal compound glands ; e, circular gland ; f, spine.

approximately of the same length as the tibia of the posterior leg, and composed of 9 segments, of which the terminal one is nearly three times the length of the 8th ; 5th-8th inclusive, more or less bead-like ; all the segments with fine hairs. Legs short and stout ; tarsus, inclusive of the claw, half the length of the tibia. Mentum (fig. 3b) monomeric and relatively very small for so large a species. Immediately below the mentum are three pairs of very large glands (fig. 3c, d), each one of the upper or proximal and the lower or distal pairs opening into a large and somewhat cylindrical chamber ; the second pair (fig. 3c₁) communicates

with a single rectangular chamber (fig. 3d), the distal lip of which has three angular projections ; at the base of each of the glands a group of minute pores (fig. 3c₂) which collectively present a reticulated appearance ; the first two pairs have relatively huge subcutaneous sclerites. In addition to the large paired glands are many others (fig. 3e) of a smaller size and with dilated subcutaneous tubes. Integument of the dorsum almost covered with minute and rather bluntly pointed spines ; numerous minute circular spinnerets and large glands, apparently of a similar form to the smaller ones found on the venter—the density of the chitin renders these organs somewhat obscure. Margin of large ventral orifice (? anal orifice or marsupium) with a broad band of densely packed and minute spinnerets. Marginal spines (fig. 3f) straight or slightly curved and slightly dilated ; in the midst of these spines at somewhat regular intervals are well-defined groups of fine hairs, about four times the length of the spines.

Length 20–25 mm. ; width 16–20 mm. ; height 10–13 mm.

SOUTHERN NIGERIA : Ibadan, 7. vi. 13, on Silk Cotton Tree (*Ceiba bombax*) (Dr. W. A. Lamborn).

Dr. Lamborn sends the following information regarding this insect :—“Coccids from branches of a fallen cotton tree, I think *Ceiba bombax*, the leaf and seed of which are now sent. The tree, which is known as the African Fetish Tree, is about our largest forest tree, being I should estimate often 130 to 140 feet in height and of enormous girth. The insects were first seen on 7th June 1913 here and there, by no means numerous and never more than two together, on the under side only of boughs averaging 7 or 8 inches in diameter. Branches larger than these were unaffected.

“The height from the ground of the affected boughs was, by tape measure, between 98 and 104 feet. The bark on them was about $\frac{1}{6}$ inch in thickness and on stripping it off one found in many cases on the light yellow surface exposed under them a dark brown discolouration about the size of a 3d. piece.

“The insects being grey in colour harmonised well with the bark. Many were quite dead and had cracked open when the tree fell so as to expose an enormous number of tiny cheese-coloured ovoid eggs. Many of the boughs had holes, evidently made by borers of some sort, and on splitting them open, cavities were found tenanted by other Coccids. Two of these which were the size of a large pea were black, and the others which were very numerous were minute and flesh-coloured.”

This remarkable Coccid somewhat resembles *Aspidoproctus pertinax*, Newst., but may at once be distinguished by its markedly greater dimensions, the presence of the double mammiform process in the middle of the dorsum ; and also in having eight instead of nine segments to the antennae.

Lindinger* has sunk *Aspidoproctus*, Newst., under the genus *Lophococcus*, Ckll.,† but leaves us still in doubt as to whether they are congeneric or not.

I had already stated‡ that the former may have to sink as a synonym of the latter ; but that it remains with Cockerell to decide as to whether his *Lophococcus*

* *Jahr. der. Hamb. Wiss. Anst.* xxx, p. 86 (1912).

† *The Entomologist*, xxxiv, p. 227 (1901).

‡ *Schultze, Zool. und anthropol. Erg., Kgl. Preuss. Akad. der Wiss. Berlin*, p. 17 (1912).

mirabilis, the type of the genus, possesses the large secretory shield or flap over the large ventral orifice or not. If this remarkable structure is present in *Lophococcus mirabilis*, *Aspidoproctus* must go, but this matter cannot be settled without reference to the type.

Dactylopius (Pseudococcus) longispinus, Targ.

SOUTHERN NIGERIA : Lagos, on an unknown plant, 12. iv. 13 (Dr. J. W. Scott Macfie).

Dactylopius (Pseudococcus) virgatus, Ckll.

BRITISH GUIANA : Georgetown, 1912 (G. E. Bodkin.)

Ceronema africana, Macfie.

SOUTHERN NIGERIA : Ibadan, 14. vi. 13 (Dr. W. A. Lamborn).

Food-plant not determined. The following information was attached to the specimens : "These Coccids already dead on the branch of a bush shrub which had died apparently as a result of their influence."

Pulvinaria jacksoni, Newstead (fig. 4).

NYASALAND : on cotton, 14. vi. 13 (E. Ballard).

Mr. Ballard writes : "I had a whole cotton-plant brought to me the other day covered with the females and their ovisacs, and forward you a small branch."



Fig. 4.—*Pulvinaria jacksoni*, Newst., ♀ ♀ and puparia of ♂ ♂, on cotton branch ; nat. size.

The infestation was very heavy ; the thicker branches being almost completely covered by the long white ovisacs, while the male puparia were attached to the smaller twigs and quite isolated from the females.

GOLD COAST : Aburi, 9. vii. 13 (*W. H. Patterson*).

Food-plant not stated. All the ovisacs in the consignment had been destroyed by a predaceous insect of some kind, so that nothing but the outline or tracks of the ovisacs were left.

SOUTHERN NIGERIA : Ibadan, on cotton, 14. xii. 11 (*A. D. Peacock*).

Several mandibulate larvae belonging apparently to the Lepidoptera were found in association with the females and may have served therefore to keep this Coccid in check.

Lecanium (Saissetia) oleae, Bern.

UGANDA : Entebbe, on *Hura crepitans*, 30. iii. 13 (*C. C. Gowdey*).

The alteration in the form of the females ("scales") and their antennae, due to Chalcidid parasites, is very marked in these examples; and although I have been unable to preserve the marginal spines in any of the microscopical preparations, the specimens are I consider referable to this species.

Lecanium (Saissetia) hemisphaericum (Targ.).

BRITISH GUIANA : Georgetown, on leaves of *Solanum melongena*, 30. iii. 13 (*G. E. Bodkin*).

Lecanium (Saissetia) nigrum (Nietn.).

BRITISH GUIANA : Brickdam Field, Georgetown, on hybrid cotton, 23. vii. 12 (*G. E. Bodkin*).

Lecanium (Eucalymnatus) tesselatum var. *perforatum*, Newst.

BRITISH GUIANA : Broad St., Georgetown, on French cashew (*Eugenia jambolana*) 24. vii. 12 (*G. E. Bodkin*).

Vinsonia stellifera, Westwood.

BRITISH GUIANA : Broad St., Georgetown, on French cashew (*Eugenia jambolana*), 24. vii. 12 (*G. E. Bodkin*).

Ceroplastes ugandae, Newstead.

UGANDA : Entebbe, on pigeon pea (*Cajanus indicus*), 30. iii. 13 (young ♀ ♀), 30. v. 13 (old adult ♀ ♀) (*C. C. Gowdey*).

The tests of the old adult females being in a much more perfect state of preservation than those upon which the original description* was based, prove that *white secretory matter from the stigmatic clefts is present on the exterior of the test and extends considerably beyond the latter in short, stout, irregularly curved processes*. The tests of the young females were so much damaged as to render them unsuitable for descriptive purposes.

Ceroplastes floridensis, Comstock.

BRITISH GUIANA : Botanic Gardens, Georgetown, 1. iii. 13 (*G. E. Bodkin*).

* Bull. Ent. Res. ii, p. 94.

Conchaspis angraeci, Ckll.

DUTCH WEST INDIES : Curaçao, on an unknown plant, 17. i. 13 (G. E. Bodkin.)

Aspidiotus destructor, Signoret.

BRITISH GUIANA : Georgetown, on *Stephanotis* sp., 15. x. 13 (G. E. Bodkin).

Aspidiotus transparens, Green.

UGANDA : Kampala, on tea, 10. vii. 11 (C. C. Gowdey)

The leaves on the food-plant were practically covered with the insects and they must therefore have caused serious injury to the plants.

Aspidiotus hederae (Vall.)

NYASALAND : Blantyre, on *Grevillea robusta*, 2. iv. 13. (E. Ballard).

The puparia were all fixed to the undersides of the leaves; on the upper surface of the latter were a few male puparia of a species of *Lecanium*.

The *Aspidiotus* was heavily infested by Chalcidid parasites.

Aspidiotus cyanophylli, Signoret.

UGANDA : Entebbe, on peach, 4. xii. 12 (C. C. Gowdey).

The infestation was apparently not a heavy one.

Aspidiotus dictyospermi, Morgan.

SOUTHERN NIGERIA : Lagos, on avocado pear, 5. v. 13 (Dr. J. W. Scott Macfie).

Nearly all the Coccids had been attacked and destroyed by a very remarkable lichen-like fungus, so much so that only two perfect females could be found.

Aspidiotus cydoniae, Comstock.

BRITISH GUIANA : Georgetown, on egg-plant (*Solanum melongena*), 24. vii. 12 (G. E. Bodkin).

Aspidiotus (Chrysomphalus) biformis, Ckll.

BRITISH GUIANA : Georgetown, 24. iii. 13 (G. E. Bodkin).

On leaves of an undetermined orchid.

Aspidiotus (Chrysomphalus) bowreyi, Ckll.

BARBADOS : Dodd's Botanical Station, on *Agave*, 20. i. 13 (J. R. Bovell).

Aspidiotus (Pseudaonidia) baikeae, sp. n.

Female puparium.—Pure white or partly yellowish-white, form low convex or rather flat and usually deltoid, owing to the arrest of growth by the mid-rib or other prominent veins of the leaf. Larval pellicle green, margins yellowish. Ventral pellicle very thin, adhering to the plant. Length 2·50–3 mm.

Female adult (fig. 5a).—Somewhat ovate but produced distally. Integument thin and clear. Pro- and meso-thoracic segments strongly defined and deeply

articulated. Free abdominal segments well defined. Cephalo-thoracic area with many large and widely separated hairs. There are 9–18 parastigmatic glands just in advance of the anterior stigmata; their presence at the lower pair of stigmata is doubtful. Pygidium (fig. 5b) with *three* pairs of tricuspid lobes: central pair much the largest and also much more distinctly tricuspid; second and third pairs narrow, but well developed. Squamae strongly bifurcated distally. Spines long and rather stout. Dorsal surface of pygidium with a large and somewhat pyriform reticulated area, the reticulations small and irregular. Circumgenital glands absent. Tubular spinnerets *short*, pores large and arranged more or less in definite linear series.

Parasitised females (fig. 5c) much larger than the normal individuals and the integument highly chitinised and distended.

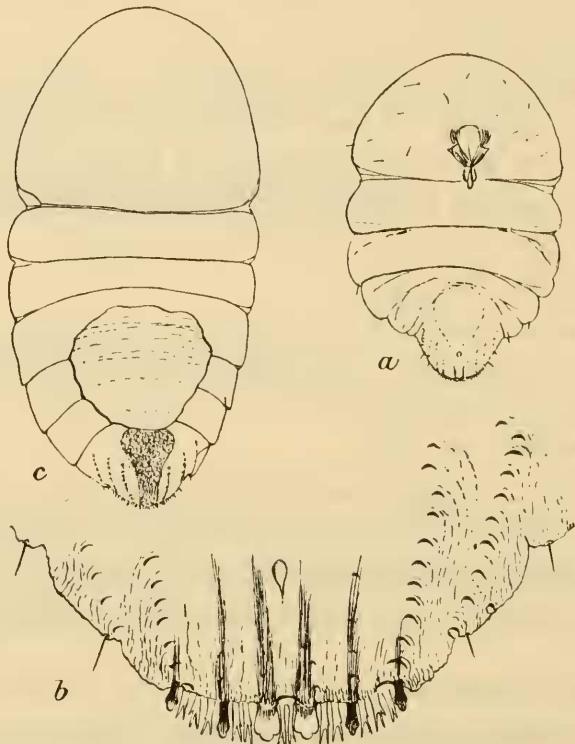


Fig. 5.—*Aspidiotus (Pseudaonidia) baikae*, Newst.; *a*, adult ♀; *b*, fringe of pygidium of ♀; *c*, parasitised ♀.

Male puparium similar to that of the female but very much smaller. *Length 1.50 mm.*

UGANDA: Entebbe, on *Baikia insignis* and an unknown shrub, 6. iv. 13 and i. v. 13 (C. C. Gowdey).

Diaspis boisduvalii, Sign., occurred in association with this Coccid, but the puparia of the latter were not fixed near the mid-rib of the leaves.

This insect is closely allied to *Aspidiotus (Pseudaonidia) trilobitiformis*, Green, but is distinguished by the colour of the puparia; and in the female by the absence of circumgenital glands, and also by the character of the fourth pair of lobes to the pygidium.

Aspidiotus (Pseudaonidia) fossor, sp. n.

Female puparium sub-circular, highly convex, black or piceous, very thick and strong, but invariably covered with a superficial layer of bark, so that it is

highly protected and inconspicuous. Larval pelicle (not buried beneath the bark) placed centrally, colour red, or dull orange red; second pelicle dull castaneous. Under surface black, smooth, but with a thin pearly grey secretion. Ventral pelicle thick, greyish, with a well defined black margin and a subcentral circular white patch, between which and the margin the sublying blackish secretion shows through in fine dark and somewhat concentric lines. *Greatest diameter, 2.50 mm.*

Female adult.—Very broadly ovate or rotund. Thorax deeply constricted and with a few scattered hairs; integument strongly chitinised. Rudimentary antennae with a single long straight hair not much larger than the scattered hairs on the surrounding integument. Parastigmatic glands present near all the stigmata: anterior pair usually with four, posterior pair with one or two. Second and third abdominal segments with a large group of minute tubercular spinnerets near the margin; the remaining segments as also the proximal portion

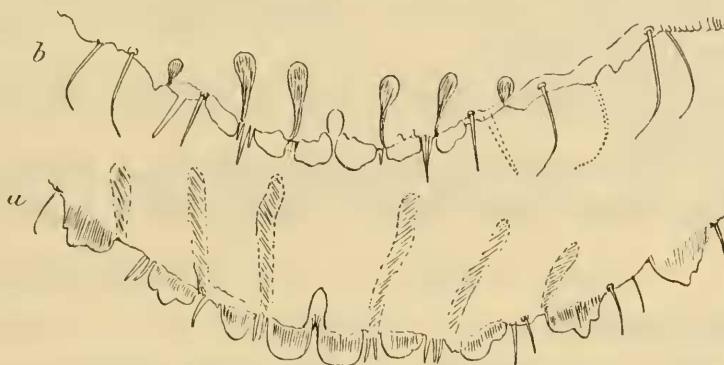


Fig. 6.—Pygidium of adult ♀ of: *a*, *Aspidiotus (Pseudaonidia) fassor*, Newst.; *b*, *A. tesseratus*, de Charmoy.

of the pygidium with a continuous band of similar spinnerets. Pygidium reticulated; without circumgenital glands; anal orifice placed a little in advance of the median pair of "thickenings of the body-wall"; the latter in two pairs are almost straight and of uniform thickness throughout; margin (fig. 6a) with three pairs of lobes and two pairs of dentate projections, the latter generally larger and therefore more conspicuous than the lobes; spines and squamae very short, the latter, as a rule, do not project beyond the lobes, or if so, only very slightly. *Length 1.50 mm.*

BARBADOS: Queen's Park, on grape vine, 21. i. 13 (*J. R. Bovell*).

This Coccid possesses the power of burrowing beneath the bark of its food-plant to the same marked extent as *Chionaspis (Howardia) biclavis*, Comst. In its structural characters it very closely resembles *Aspidiotus (Pseudaonidia) tesseratus*, de Charmoy, but has relatively much shorter spines and squamae; the thickenings of the body-wall are longer and of uniform width throughout; and the dentate projections of the margin of the pygidium are also much more markedly pronounced.

Aspidiotus (Pseudaonidia) tesseratus, de Charmoy. (Fig. 6b).

BARBADOS: Dodd's Botanical Station, on *Cassia fistula*, 1913 (*J. R. Bovell*).

Aspidiotus (Pseudaonidia) trilobitiformis, Green.

ZANZIBAR : On baobab (*Adansonia digitata*), 20. v. 13 (Dr. W. M. Aders).

The puparia, all females, were arranged along the mid-rib of the leaf. Those on the upper surface being much paler than those on the underside of the leaf, owing apparently to the action of stronger light.

Aspidiotus (Selenaspis) articulatus, Morgan.

BRITISH GUIANA : Georgetown, on Liberian coffee and an ornamental palm, 23. vii. 12 (G. E. Bodkin).

UGANDA : Banda, Chagwe, on coffee, 14. xii. 12 (C. C. Gowdey).

The examples from Uganda were unusually large, many of them being twice the size of those from the West Indies.

Diaspis boisduvalii, Signoret.

BRITISH GUIANA : East Coast, 2. iii. 13, and Botanic Gardens, Georgetown, on *Catleya superba* and plantain.

UGANDA : Entebbe, on *Baikia insignis* and an unknown shrub, 6. iv. 13 and 1. v. 13 (C. C. Gowdey).

There are some very slight morphological differences between the African examples and those found under glass in Europe, but I cannot separate them specifically.

Chionaspis citri, Comstock.

BRITISH GUIANA : Georgetown, on lime and orange, 27. vii. 12 (G. E. Bodkin).

Chionaspis funtumiae, sp. n.

Female puparium.—Opaque white or pale ochraceous; form usually broadly dilated immediately behind the second pellicle. Larval pellicle dull yellow, with a dusky median area; second pellicle partly covered with a thin translucent secretion. Ventral pellicle exceedingly thin and adhering to the plant. Length 2.5–2.9 mm.

Male puparium opaque white or pale ochraceous; *non-carinated*, the texture similar to that of the female; sides slightly bulging, very narrowly pyriform or rarely parallel. Occasionally it is slightly contorted or curved. Length 1.5–1.6 mm.

Female adult.—Markedly narrowed in front. Rudimentary antennae with 2–3 curved spines, one of them slightly stouter than the rest. Anterior pair of spiracles with 5–6 parastigmatic glands; posterior pair usually with 2–3. Proximal half of the margin of the thoracic area with numerous small pores; and many slightly larger pores on the abdominal segment. Genital orifice very slightly in advance of the anal opening; both organs placed proximally. Pygidium (fig. 7) small. Median lobes large, widely separated, suddenly attenuated distally, lateral margins faintly serrated, striae distinct, parallel; second pair of lobes duplex and unequal; third pair somewhat rudimentary and sometimes also duplex. Squamae spiniform and arranged in pairs between the lobes and one pair beyond the latter. Spines minute. *Circumgenital glands absent*.

UGANDA: Entebbe, on *Funtumia latifolia*, 27. v. 13. (C. C. Gowdey). The infestation is extensive, the twigs being partly covered by the puparia.

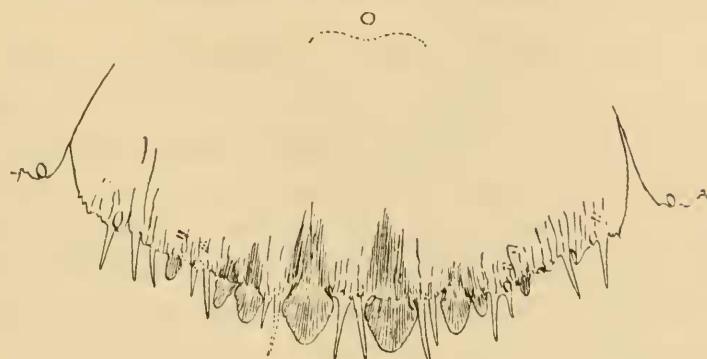


Fig. 7.—*Chionaspis funtumiae*, Newst. ; fringe of pygidium of adult ♀.

The absence of longitudinal carinae in the puparia of the male of *Chionaspis* is very rare indeed ; in this species there is not even a faint trace of them, and what is still more remarkable, they are similar in texture to those of the female. The widely separated and somewhat obconical lobes of the pygidium, in the female, with their bilateral serrations, are also markedly characteristic and bear a rather striking resemblance to the corresponding organs in *Mytilaspis (Lepidosaphes) chitinosus*, Lindinger (Jahrb. Hamb. Wiss. Anst, xxvi, p. 34, 1909).

Chionaspis (Howardia) biclavis var. **detecta** (Mask.).

BRITISH GUIANA: Botanic Gardens, Georgetown, on *Sapium jenmani* and jasmin (*Tabernaemontana wallichii*), 23. vii. 12 and 31. i. 13 (G. E. Bodkin).

Mytilaspis (Lepidosaphes) beckii (Newman).

BRITISH GUIANA: Georgetown, on lime (*Citrus*) and crotons, 24 & 29. vii. 12 (G. E. Bodkin).

Pinnaspis buxi (Bouché).

BRITISH GUIANA: Botanic Gardens, Georgetown, on ornamental palms, 23. vii. 12 (G. E. Bodkin).

BARBADOS: Merton Lodge, on *Alocasia* sp., 22. i. 13 (J. R. Bovell).

Ischnaspis filiformis (Douglas).

BRITISH GUIANA: Botanic Gardens, Georgetown, on ornamental palm, 23. vii. 12 (G. E. Bodkin).

SOUTHERN NIGERIA: Lagos, 7. iv. 13 (Dr. J. W. Scott Macfie).

Found "on an unknown tree near pond" in association with a species of *Aleurodes*.

Parlatoria ziziphus (Lucas).

BRITISH GUIANA: Georgetown, on lime tree (*Citrus*), 24. vii. 12 (G. E. Bodkin).